

REMARKS

The Office action of April 6, 2005, has been carefully considered.

Claims 1 through 8 have been rejected under 35 USC 103(a) over Gaucher et al.

Claim 1 has now been amended to incorporate the recitations of Claim 4 which has been canceled. Similarly, Claim 7 has been amended to incorporate the recitations of Claim 8, which has been canceled.

The invention is directed to a surface treating method for a titanium part comprising determining an effective thickness of a hard oxide film to be formed on the surface of the part, determining an effective surface roughness of the hard oxide film, and oxidation treating the surface of the part under a desired temperature and time such that both of the determined effective thickness and effective surface roughness are obtained. The effective surface thickness will be 14 micrometers or less, and the effective roughness will be 3.0 Rz or less.

As discussed in the specification, it was conventionally believed that thicker oxide films, for example more than 30 micrometers, would be better than thinner oxide films. However, the inventors have discovered that excessively thick oxide films may reduce the fatigue strength of the titanium part. Thus, the inventors determined the upper limit of the thickness that could effectively prevent the reduction of the fatigue strength of the part.

Gaucher et al does not teach or suggest that the upper limit of the effective thickness must be determined in order to prevent a reduction of the fatigue strength. Gaucher et al does teach that a film having sufficient thickness is appropriate, but does not disclose or suggest that the

effective thickness should be limited to a particular value in order to influence the fatigue strength.

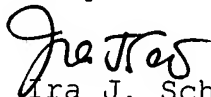
As discussed in paragraph [0025] of the present specification, the thinner film 18 has a better surface condition or smaller surface roughness when compared to the thicker film. Applicants have discovered that the thinner film may effectively avoid much of the stress concentration of the thicker film, thereby preventing crack formation in the thinner film. Even if a crack is formed in the thinner film, the overall stress concentration is minimized because the crack is relatively short, and generally does not extend into the base metal portion.

It is noted that in Example 4 of Gaucher et al, oxide layer thicknesses of about 24 microns (column 8, line 38) and 15 microns (column 9, line 44) were observed.

As the Gaucher et al reference does not disclose or suggest limiting the oxide layer thickness and surface roughness in order to improve fatigue behavior, withdrawal of this rejection is requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,



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